Perspectives

SUMMARY OF INSTRUCTIONAL ACTIVITIES

Restoring Milagra Ridge & Question Formulation - page 4

- Students review Restoring Milagra Ridge on the National Park Labs web site: www.nps.gov/goga/parklabs
- Students work together to formulate questions about Milagra Ridge, Endangered Species Act, Golden Gate National Recreation Area, or other elements of the program.
- Students use a word puzzle and the National Park Labs web site Glossary to study vocabulary.

Perspectives - page 11

- Students are introduced to the restoration cycle.
- Students learn about concepts such as biological diversity, endangered species and land use.
- Students consider the role of the National Park Service by studying its mission statement.
- Students examine their pre-conceived ideas about environmentalists and what it means to be an environmentalist.

Top Ten Environmental Rights - page 14

- Students create their list of Top Ten Environmental Rights.
- Students compare their ideas about environmental rights with the ideas of others and with the National Park Service mission.
- Students think about what they might find in a national park that shows how the National Park Service fulfills its mission and supports Environmental Justice.

The Restoration Cycle

Restoring native plant habitats takes place on a yearly cycle. Timing is determined by factors such as weather, when plants bloom, and when they go to seed.

Plan

Planning plays a significant role throughout the habitat restoration cycle. Many factors must be considered before a plan can be developed and implemented.

Planners must address issues such as environmental impact, cultural and historical significance, recreational uses, long-term management costs, and volunteer and educational opportunities. Once a long-term plan has been drawn up, restorationists create short-term plans addressing the nuts and bolts of growing, caring for, and planting indigenous plants into a restoration site.

Remove

Before a restoration site can receive indigenous plants, invasive exotic plant species must be removed. Exotic plants are those occurring as a result of deliberate or accidental actions by humans. These plants can originate from many different countries; those from Mediterranean climates are particularly successful at establishing themselves in San Francisco.

Exotic plants were brought to the Bay Area for agriculture, livestock grazing, forestry, ornamental landscaping, and soil stabilization. Many exotic plants outcompete indigenous plants. This can result in a dramatic reduction of bio-diversity.

When and how exotic plants are removed varies depending on the characteristics and life cycle of each species. Some plants, such as mustard, are annuals and grow only during a brief period. It is important to remove mustard before it can go to seed. Perennial plants, such as ice plant, can be removed all year.

Plants are safely removed by using the best tool for the job. A weed wrench can leverage some pulling power to remove the deeply rooted scotch broom. A small hand pick helps to dig up pampas grass seedlings. But a polaski is used to remove the larger bushes. Sometimes the best tool for the job is a pair of strong hands. The relatively shallow roots of the iceplant allow it to easily separate from the soil.

Propagate

Plants indigenous to Golden Gate National Recreation Area (GGNRA) are not sold in local nurseries or seed catalogs. Therefore, the park staff propagate the plants needed for habitat restoration projects in the park's own native plant nurseries. These plants are used to revegetate a variety of plant communities within the park including sand dunes, riparian, coastal scrub, and many more.

Plant propagation is the multiplication of plants by either sexual or asexual methods. Sexual multiplication is carried out using seeds, while asexual multiplication is done with cutting, layering, division, or grafting. Propagules (seeds and cuttings) for revegetation are collected from the restoration site itself or from the surrounding areas, the closer to the site the better. It has been discovered that the genotype (genetic makeup) of plants can change within very short distances.

The time of year when seeds and cuttings are collected depends on the life cycle of each plant species. Generally, collection takes place between spring and fall. No more than 10 percent of the native seed base is collected. This allows the habitat to continue to build its own seed base.

Getting seeds to germinate in a nursery can sometimes be challenging. For example, in nature, small rodents eat lupine seeds. When the seed passes through the rodent's digestive system, the outer seed coat is scarified and redeposited on the ground with the animal's feces. This acts as a natural fertilizer. Natural processes such as this need to be mimicked in the nursery. To do so, nursery staff put seeds in a contraption that uses sandpaper to scarify the seed and then the seeds are planted in compost.

Plant

Revegetation means to provide an area with new plant cover. Once invasive exotic plants have been removed, appropriate indigenous species are planted to help the habitat recover.

Revegetating a vulnerable site both helps prevent a reinvasion of exotic species and rebuilds the native seed bank. Thus, the plant community reaches a state of resiliency more quickly and is able to provide habitat for other members of its ecosystem. Outplanting and direct seeding are the two methods of revegetation that are used at GGNRA.

Outplanting is the process of taking plants that have been raised in the nursery (which sometimes includes immature specimens) and planting them in the landscape. Direct seeding is the process of sowing seeds in the restoration site and letting

them germinate and develop naturally. Once in their natural habitats, native plants are essentially on their own. A strong root system, which allows a plant to access water and nutrients, is key to the plant's survival.

Revegetation takes place during the rainy season. Working in wet and/or muddy conditions may not be comfortable, but it significantly reduces the mortality rate of the seedlings and makes all the hard work in the nursery worthwhile.

Monitor

Monitoring is the collection and analysis of data at regular intervals over time. It is used to predict or detect natural and human-induced changes and to provide the basis for the appropriate management response.

The collection of baseline data on natural resources and the initiation of long-term monitoring programs are essential parts of the natural resource program. The GGNRA monitors approximately 2 percent of a restoration site. This low percentage is due to constraints in time and the number of people available to do the work. Monitoring methods are employed to generate qualitative and quantitative data. Qualitative data is gathered using photomonitoring, and quantitative data is gathered by conducting vegetative transects. Monitoring data is used to revise both long-term and short-term plans, completing the restoration cycle.

Restoring Milagra Ridge & Question Formulation

SUMMARY
Students read Restoring Milagra Ridge using the National Park Labs web site and answer journal questions. Students become acquainted with vocabulary as they use the web site (or the Glossary from this handbook) to complete a word puzzle. Students formulate questions that will help motivate their learning for the remainder of the program.

TIME
100 minutes

MATERIALS
- Computers with Internet access or copies of Restoring Milagra and copies of the Glossary (in the last section of this handbook)
- Vocabulary Word Puzzle
- Perspectives Worksheet #1

Lesson

Teacher explains to the class that the restoration project they will perform at Golden Gate National Recreation Area is a hands-on science project. Students need to know the human and natural history of Milagra Ridge, as well as the vocabulary of habitat restoration so that they can fully understand the issues involved in the project.

Teacher distributes Perspectives Worksheet #1. Students access the web site (or Milagra Ridge handout) and complete the worksheet.

Teacher distributes the Vocabulary Word Puzzle. Definitions to the hidden words are provided on the handout. To solve the word puzzle, students must access the National Park Labs web site, go to the Glossary, and look for the words that match the definitions. Students complete the word puzzle. The class discusses and clarifies any definitions that were difficult to understand.

Students brainstorm questions they have about the National Park Labs program, the National Park Service, the history of Milagra Ridge, the students' role in the program, etc.

Students enter these questions in Perspectives Worksheet #1. This is the first step in a questioning process that will continue throughout the program. The purpose of the questioning is not necessarily to find answers but rather to allow the questioning to evolve with deeper sophistication and understanding of the issues.

Restoring Milagra Ridge

Milagra Ridge, a 240-acre parcel of land that overlooks the town of Pacifica, California, is essentially an island ecosystem surrounded on all sides by development and unconnected with any other parcel of open space. Invasive plants, soil erosion, and soil compaction due to off-trail traffic challenge this delicate ecosystem in its efforts to sustain biological and genetic diversity. Once a part of the United States Army's coastal fortification system, Milagra Ridge was added to Golden Gate National Recreation Area (GGNRA) in 1987. Noting the rare and endangered species -including the Mission blue butterfly (Icaricia OR Plebejus icarioides missionensis) –found there, the National Park Service dedicated its efforts to the ridge's ecological restoration.

Milagra Ridge comprises the relatively flat ridge top; two hills on the southeast and northwest sides of the ridge with peak elevations of 710 and 672 feet, respectively; and steep slopes draining into Milagra Creek on the northeast. In the eastern portion of the ridge, there is also a settling pond that was created by the military for sewage treatment. The settling pond has since developed into an important wetland habitat for a number of animals, including the red legged frog (Rana aurora draytonii), a species that is threatened in California.

Coastal scrub and coastal prairie are the major plant communities found on the windy, often-foggy, exposed slopes of Milagra Ridge. Coastal scrub dominates the slopes, and assemblages of mixed scrub and prairie (grassland) species occupy the ridge top. Silver leaf lupine (Lupinus albifrons), a small and uncommon native plant, supports a population of the federally listed endangered Mission blue butterfly on Milagra Ridge. Stonecrop (Sedum spathulifolium), a succulent plant found in rocky outcroppings on the ridge, supports the federally listed endangered San Bruno elfin butterfly (Callophrys mossii bayensis). Native animals found on Milagra Ridge include gray fox, bobcat, skunk, raccoon, gopher, mice and voles, black tailed deer, coyote,

garter snakes, gopher snakes, western fence lizards, American kestrels, red-tailed hawks, scrub jays, hummingbirds, ravens, and many others.

Students from local high schools help restore indigenous plant habitat on Milagra Ridge, which in turn assists in the protection of the ridge's endangered species. Throughout the year, they participate in every phase of the restoration cycle, from collecting seed to growing native plants in the school's nursery, and finally, to outplanting the young plants in the landscape.

The Site Stewardship Program (SSP) of the Golden Gate National Parks Association, the nonprofit partner of the GGNRA, manages the restoration and monitoring of Milagra Ridge. Site Stewardship staff and volunteers work together to restore the ecological integrity of GGNRA lands and to protect rare and endangered species.

Perspectives Worksheet #1

Directions: Go to Golden Gate National Recreation Area's National Park Labs web site: www.nps.gov/goga/parklabs. Find Restoring Milagra Ridge. Answer the questions below.

PART 1

1. Why did Milagra Ridge become a national park?

2. How was Milagra Ridge used before it became a national park?

3. Why is it considered an island ecosystem?

4. What are the endangered species that live at Milagra Ridge?

5. How does your community help protect endangered species?

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PART 2
Write at least 3 questions that you have about the National Park Labs program, the National Park Service, your role in the program, etc.

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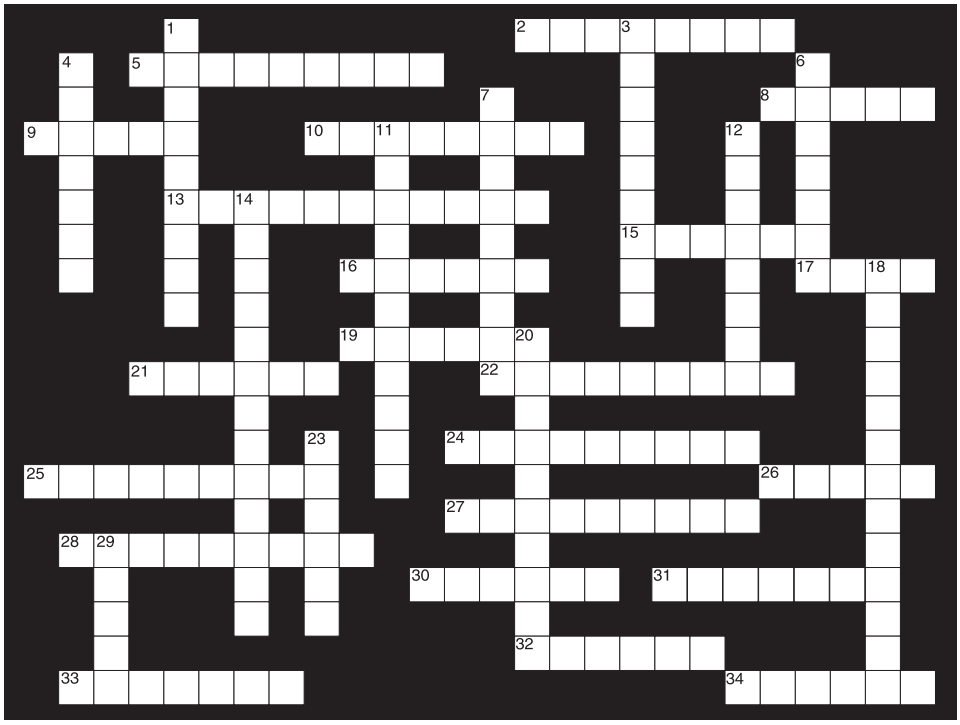
Vocabulary Word Puzzle

Directions: Go to Golden Gate National Recreation Area's National Park Labs web site: www.nps.gov/goga/parklabs/. Find the Glossary. Find the words that match the definitions.



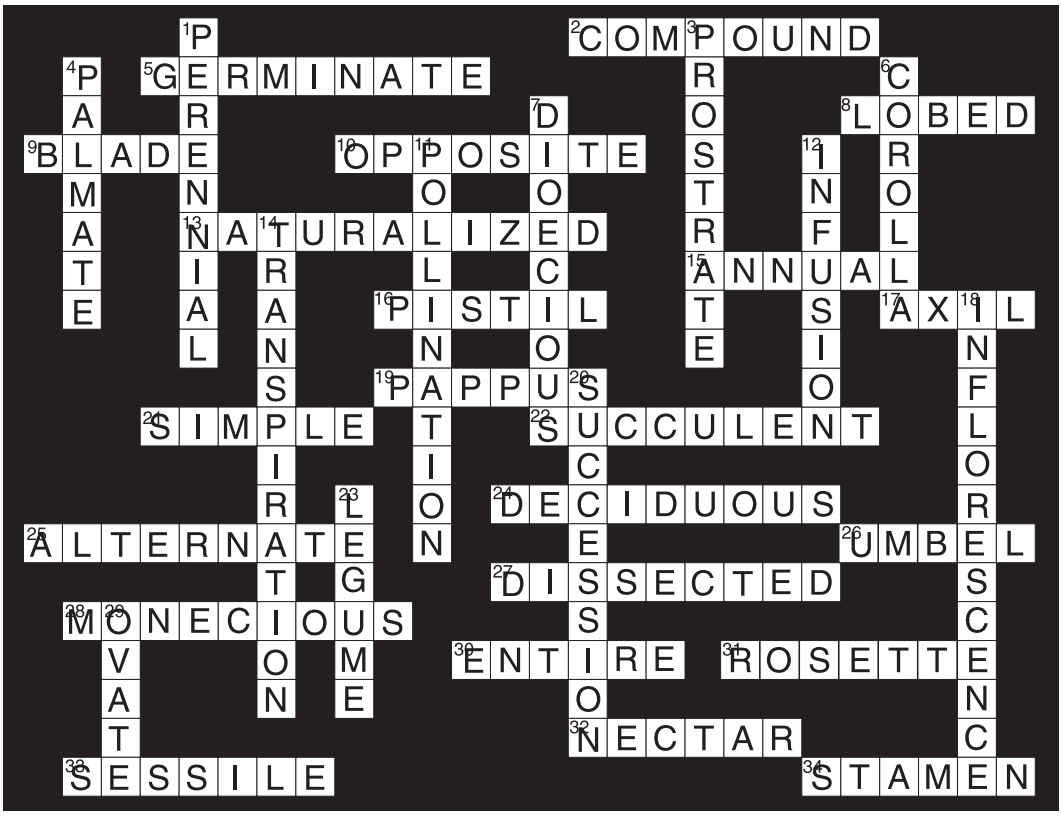
ACROSS

2 One leaf contains several leaves
5 To sprout
8 Leaves with round or wavy edges
9 The leaf itself
10 Leaves directly across from one another
13 Taking over natural range of native plants
15 Plants that die after 1 year
16 Female part of a flower
17 Where the leaf attaches to the stem
19 A tuft of hair
21 A leaf with only one segment
22 A plant with thick, fleshy leaves
24 Plants that lose leaves when it gets cold
25 Leaves not directly across from each other
26 A convex-shaped inflorescence
27 Leaves that look feathery
28 Male and female flowers on one plant
30 Leaves with straight, smooth edges
31 Circular cluster of leaves at plant base
32 Sweetish liquid in flowers
33 Having no stalk
34 Male part of a flower

DOWN

1 Plants that resprout without being replanted
3 Lying flat or trailing along the ground
4 Leaves shaped like a hand
6 Petals of a flower
7 Species with male and female plants
11 Leads to fertilization and seed production
12 Liquid extract
14 Loss of water from plants
18 The flowering part of a plant
20 Progressive changes in nature
23 A plant with nitrogen-fixing bacteria
29 Leaves that are egg-shaped

Vocabulary Word Puzzle (Key)



Perspectives

SUMMARY
Students meet members of the park education staff and learn about the National Park Service mission, park resources specific to Milagra Ridge, and concepts such as biological diversity, endangered species, and land use. They create their own version of the restoration cycle, and begin to develop their own sense of stewardship.

TIME
100 minutes

MATERIALS
- National Park Service mission puzzles
- Restoration Cycle cards
- Copies of poem
- Perspectives Worksheet #2

Lesson

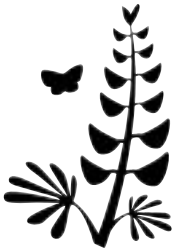
Park staff introduce themselves. They explain park staff role in the National Park Labs program. The class discusses the questions students formulated in the lesson on Restoring Milagra Ridge and Question Formulation.

Students work together in groups to assemble puzzles. The activity introduces students to the National Park Service mission, park resources specific to Milagra Ridge and related concepts.

Students continue in small groups to learn the restoration cycle. They use cards with descriptive words or illustrations to place in order by season. Each group posts their restoration cycle on the wall. Students conduct a gallery walk while answering questions in Perspectives Worksheet #2. Everyone then discusses the role students will have in returning open space to its indigenous plant ecosystem.

Students listen to a poem about one meaning of stewardship. They write their interpretation in Perspectives Worksheet #2.

Perspectives Worksheet #2



Directions:
Answer the following questions during your gallery walk.

1. In what ways are the restoration cycle presentations alike?

2. In what ways are the presentations different?

3. What are the main steps in the restoration cycle?

4. What are conditions that could cause the restoration cycle to change?

5. What is your role in the restoration cycle at Milagra Ridge?

QUOTE:
You must teach your children that the ground beneath their feet is the ashes of our grandfathers. So that they will respect the land, tell your children that the earth is rich with lives of our kin. Teach your children what we have taught our children – that the earth is our mother. Whatever befalls the earth befalls the sons of the earth. If men spit upon the ground, they spit upon themselves. This we know. The earth does not belong to man; man belongs to the earth. This we know. All things are connected like the blood which unites one family. All things are connected. Whatever befalls the earth befalls the sons of the earth. Man did not weave the web of life; he is merely a strand in it. Whatever he does to the web, he does to himself…. *Chief Seattle*

6. What is your understanding of this quote?

Top Ten Environmental Rights

SUMMARY
As an introduction to Environmental Justice, students identify and question stereotypes they may have about environmentalists. Students create a list of Top Ten Environmental Rights. They compare their ideas about fundamental environmental rights with the National Park Service mission and the *Principles of Environmental Justice*, created at the First National People of Color Environmental Leadership Summit. Students think about what they might see in a national park that would indicate that the National Park Service fulfills its mission and supports Environmental Justice.

TIME
Part 1: 30 minutes
Part 2: 40 minutes

MATERIALS
- National Park Service mission
- *Principles of Environmental Justice*
- Perspectives Worksheets #3, #4, #5 and #6

Lesson

Part 1
Students receive Perspectives Worksheet #3. Students envision an environmentalist and then draw this person. Students share and describe their drawings. As they present their work, teacher asks questions about their pictures to help clarify their perspectives and identify any subconscious assumptions or stereotypes:

- What type of environmental issue is your environmentalist supporting?
- How much money does your environmentalist make a year?
- What is the education level of your environmentalist?
- What is your environmentalist wearing?
- What is the race and gender of your environmentalist?
- Where does your environmentalist live?

Teacher gives each student Perspectives Worksheet #4 and facilitates a discussion about the drawing exercise:

- How are these examples of environmentalists similar?
- How are these examples different?
- Are there types of people (race and gender) who are not represented in these drawings?
- What environmental issues concern the people in the drawings?
- What is the definition of an environmentalist?

Students write a paragraph answering the following question:

- Are you an environmentalist? Why or why not?

Part 2

Teacher divides the class into small groups and gives each student Perspectives Worksheet #5. Groups brainstorm at least three environmental rights everyone deserves.

Class creates their list of Top Ten Environmental Rights by combining their lists.

Students receive Perspectives Worksheet #6, the *Principles of Environmental Justice* and the National Park Service mission. They identify the similarities and differences between their Top Ten Environmental Rights, the *Principles of Environmental Justice*, and the National Park Service mission.

Students discuss what physical evidence they might see at a national park that would indicate that the National Park Service fulfills its mission and supports Environmental Justice. Teacher prompts the students to think about the diversity of people (different languages, disabilities, children, elderly, etc.) they might find in a national park and the things that make national parks accessible to specific groups (multilingual signs, curb cuts, children's activities, wheelchair-accessible trails).

Students add to or revise the questions they have in their Perspective worksheets based on this lesson before they visit the park.

Principles of Environmental Justice

PREAMBLE

We, the People of Color, gathered together at this multi-national People of Color Environmental Leadership Summit, to begin to build a national and international movement of all peoples of color to fight the destruction and taking of our lands and communities, do hereby re-establish our spiritual interdependence to the sacredness of our Mother Earth; to respect and celebrate each of our cultures, languages and beliefs about the natural world and our roles in healing ourselves; to insure Environmental Justice; to promote economic alternatives which would contribute to the development of environmentally safe livelihoods; and to secure our political, economic and cultural liberation that has been denied for over 500 years of colonization and oppression, resulting in the poisoning of our communities and land and the genocide of our peoples, do affirm and adopt these Principles of Environmental Justice:

1. Environmental Justice affirms the sacredness of Mother Earth, ecological unity and the interdependence of all species, and the right to be free from ecological destruction.

2. Environmental Justice demands that public policy be based on mutual respect and justice for all peoples, free from any form of discrimination or bias.

3. Environmental Justice mandates the right to ethical, balanced and responsible uses of land and renewable resources in the interest of a sustainable planet for humans and other living things.

4. Environmental Justice calls for universal protection from nuclear testing, extraction, production and disposal of toxic/hazardous wastes and poisons and nuclear testing that threaten the fundamental right to clean air, land, water and food.

5. Environmental Justice affirms the fundamental right to political, economic, cultural and environmental self-determination of all peoples.

6. Environmental Justice demands the cessation of production of all toxins, hazardous wastes, and radioactive materials, and that all past and current producers be held strictly accountable to the people for detoxification and the containment at the point of production.

7. Environmental Justice demands the right to participate as equal partners at every level of decision-making including needs assessment, planning, implementation, enforcement and evaluation.

8. Environmental Justice affirms the right of all workers to a safe and healthy work environment, without being forced to choose between an unsafe livelihood and unemployment. It also affirms the right of those who work at home to be free from environmental hazards.

9. Environmental Justice protects the right of victims of environmental injustice to receive full compensation and reparations for damages as well as quality health care.

10. Environmental Justice considers governmental acts of environmental injustice a violation of international law, the Universal Declaration On Human Rights, and the UN Convention on Genocide.

11. Environmental Justice must recognize a special legal and natural relationship of Native Peoples to the U.S. government through treaties, agreements, compacts, and covenants affirming sovereignty and self-determination.

12. Environmental Justice affirms the need for urban and rural ecological policies to clean up and rebuild our cities and rural areas in balance with nature, honoring the cultural integrity of all our communities, and providing fair access for all to the full range of resources.

13. Environmental Justice calls for the strict enforcement of principles of informed consent, and a halt to the testing of experimental reproductive and medical procedures and vaccinations on people of color.

14. Environmental Justice opposes the destructive operations of multi-national corporations.

15. Environmental Justice opposes military occupation, repression and exploitation of lands, peoples and cultures, and other life forms.

16. Environmental Justice calls for the education of present and future generations which emphasizes social and environmental issues, based on our experience and an appreciation of our diverse cultural perspectives.

17. Environmental Justice requires that we, as individuals, make personal and consumer choices to consume as little of Mother Earth's resources and produce as little waste as possible; and make the conscious decision to challenge and reprioritize our lifestyles to insure the health of the natural world for present and future generations.

Adopted, Washington, D. C., October 1991
First National People of Color Environmental Leadership Summit

National Park Service Mission

To conserve the scenery and the natural and historic objects and wildlife therein, and to provide for the enjoyment of the same in such a manner and by such means as will leave them unimpaired for the enjoyment of future generations.

Perspectives Worksheet #3

Directions: Draw a picture of an environmentalist.
Label the parts of your drawing that identifies your image as an environmentalist.

Perspectives Worksheet #4

Directions: Answer the questions below.

1. What is the definition of an environmentalist?

2. What are common concerns of people who care about their environment?

3. Are you an environmentalist? Write a paragraph that explains why or why not.

4. What concerns do you have about your environment?

Perspectives Worksheet #5

Directions: Brainstorm at least three environmental rights with others in your group. Create a list of Top Ten Environmental Rights with the all members of your class.

1. What are the environmental rights that every person deserves?

2. What are the Top Ten Environmental Rights as determined by the members of your class?

Perspectives Worksheet #6

Directions: Read the Principles of Environmental Justice and the National Park Service mission. Answer the following questions.

1. What are the similarities among the National Park Service mission, the Principles of Environmental Justice and your Top Ten Environmental Rights?

2. What is your definition of Environmental Justice?

3. Discuss the physical evidence that you might see at a national park that would indicate that the National Park Service fulfills its mission statement and addresses Environmental Justice. Cite the physical evidence and its function below.

Physical Evidence	Function

4. What other questions do you have about the documents?